

## **DEPARTMENT OF LAND AND NATURAL RESOURCES**

### **DIVISION OF BOATING AND OCEAN RECREATION (DOBOR) TSUNAMI EMERGENCY PLAN FOR BOATERS**

#### **BACKGROUND**

A tsunami is a series of ocean waves that are set in motion by great disturbances in the earth's crust. These disturbances are normally earthquakes or natural events associated with earthquakes, such as volcanic eruptions and explosions that vertically displace the water column in the ocean. For this reason, a tsunami is sometimes called a seismic sea wave (the word "seismic" referring to earthquakes), but a tsunami can also be caused by non-seismic events such as landslides and meteorite impacts.

Tsunami are also sometimes called tidal waves because as they strike a river or a low-lying land area. They may resemble the bore tidal waves that daily flood the mouth of the Amazon River in Brazil, the Bay of Fundy in Canada, and other funnel-like geographical sites. Tsunami, though, have nothing to do with the tides.

There is no tsunami season. A tsunami is an unpredictable event that can happen at any time. Most tsunamis that strike the Hawaiian Islands are generated in the oceanic trenches around the border of the Pacific Ocean. The unstable areas are the Pacific Coast of Japan, the Kurile-Kamchatka Island chain, the Aleutian Island Arc, and the Pacific Coasts of Central America and South America.

Tsunami have great destructive potential and are capable of inundating (or flooding) areas hundreds of feet inland past the normal high tide level. Their fast-moving waters can crush cars, homes, buildings, boats, and anything else in their path. They also have great erosional potential, stripping beaches of sand and undermining trees and other coastal vegetation.

In Hawaii, tsunamis have been most destructive on the Big Island. Major portions of the city of Hilo were totally destroyed in 1946 and again in 1960. Both of these tsunamis were generated by earthquakes in the Pacific Rim: the first occurred in the Aleutian Islands and the second along the coast of South America.

A tsunami in Hawaii can also be generated by nearby as well as distant earthquakes. This is especially true on the Big Island where seismic events are commonly associated with the volcanic activity at Kilauea and Mauna Loa. Any violent earthquake—one that causes you to fall to the ground or to hold onto something to keep from falling—should be considered a natural tsunami warning. If in a low-lying area, you should move immediately to higher ground. In 1975 two campers at Halape on the shoreline of Hawaii Volcanoes National Park were killed by a locally generated tsunami before they had a chance to escape. That tsunami struck Halape immediately after the occurrence of an extremely violent earthquake that was centered only a few miles away.

In general, all coastal areas of the Hawaiian Islands are vulnerable to inundation by tsunami. See the Civil Defense pages in the front of the telephone book for maps of the coastal evacuation zones.

## **TSUNAMI WARNINGS FOR DISTANT EARTHQUAKES**

In the event of a significant earthquake in a distant area of the Pacific Basin, the Pacific Tsunami Warning Center (PTWC) on Oahu will issue a **Tsunami Watch** until a tsunami can be confirmed or discounted.

### **DOBOR RESPONSE TO A TSUNAMI WATCH**

Depending on the location of a seismic disturbance, shorelines affected by a tsunami can be predicted by the PTWC. Following the issuance of a Tsunami Watch and the area of impact determination, DOBOR District Managers at the direction of the Division Administrator will instruct specific harbors to follow the following procedure:

1. Make sure all radios and other communication equipment are functioning/charged.
2. Secure and protect emergency call lists and keep them close at hand.
3. Gather vital records and prepare them for possible removal from site should evacuation be required. Other records deemed highly valuable by the District Manager can be gathered and prepared for removal as time allows.

PTWC will issue a **Tsunami Warning** when a tsunami is confirmed and evacuation is necessary.

The warning will be announced over the radio and on television through the Emergency Broadcast System, in conjunction with the sounding of Civil Defense sirens. The warning will include the predicted time of arrival of the first wave. Civil Defense sirens will be sounded three hours, two hours, one hour and 30 minutes prior to the estimated arrival time of the first wave.

### **DOBOR RESPONSE TO A TSUNAMI WARNING**

Following the issuance of a Tsunami Warning or a minimum of three hours prior to the arrival of the first wave, DOBOR District Managers at the direction of the Division Administrator will initiate the following harbor closure procedure:

### **PROCEDURES FOR CLOSING HARBOR:**

1. Protect vital records by removing them from the inundation zone.
2. Harbor staff will contact tenants. Harbor tenants will be expected to have their facilities secured and personnel vacated when the Tsunami Warning is issued.
3. Harbor personnel may direct traffic within the harbor to expedite evacuation if necessary. No unnecessary vehicles will be allowed on the harbor's property during evacuation. Tenants and harbor users should be urged to leave as early as possible to avoid gridlock in the inundation zones.

4. In the interest of safety, and for the protection of State property, staff and the maintenance crew may assist harbor tenants and harbor users in their emergency preparations at the discretion of the Harbor Agent.
5. As soon as all closure procedures are completed, power, water and other utilities are to be shut off and the Harbor will be secured.
  - a. All harbor personnel will be released to go home, to a designated shelter, to evacuate to higher ground or evacuate “vertically” above the fourth floor in the nearest concrete building with four or more floors.
  - b. Employees should monitor radio broadcasts and return to work when the “All Clear” is sounded and/or upon contact by their Supervisor.

## **LOCAL EARTHQUAKES**

If a significant earthquake occurs in the vicinity of the Hawaiian Islands, PTWC will issue an Urgent Tsunami Warning.

The warning will be announced over the radio and on television through the Emergency Broadcast System, in conjunction with the sounding of Civil Defense sirens. **If the Urgent Tsunami Warning identifies the island you are on as subject to impact, leave any evacuation zone immediately.**

In the event of a local earthquake that causes you to fall to the ground or to hold onto something to keep from falling, if you are in an evacuation zone, move immediately to higher ground when the shaking stops. There may be no time for an official warning from PTWC, the Emergency Broadcast System, or Civil Defense sirens. **You must act on your own.**

## **DOBOR RESPONSE**

In the event of a severe local earthquake or immediately following issuance of an Urgent Tsunami Warning, Harbor Agents will secure harbor offices and immediately evacuate to higher ground or evacuate “vertically” above the fourth floor in the nearest concrete building with four or more floors. Employees should monitor radio broadcasts and return to work when the “All Clear” is sounded and/or upon contact by their Supervisor.

All-Clear announcements will be made by local authorities through the Emergency Broadcast System over the radio and on television. Civil Defense sirens are neither sounded during All-Clear announcements nor used to indicate All-Clear conditions. Remain in a safe area until you hear an official All-Clear announcement over the Emergency Broadcast System.

## **PLANNING AHEAD: SUGGESTIONS FOR DOBOR FACILITY USERS**

The need to evacuate may occur suddenly and at any time. All boaters should know what to do in the event of a severe local earthquake and should develop a Tsunami Evacuation Plan that includes any of the following steps that are applicable to their boat and their situation.

A1. If your boat is on a trailer in an evacuation zone, move it outside the evacuation zone as soon as a Tsunami Warning is declared.

2. If your boat is in the water and cannot be trailered, move it offshore to waters over 200 fathoms (1,200 feet) deep as soon as a Tsunami Warning is declared. Tsunami can cause rapid changes in water level and unpredictable and dangerous currents in harbors and entrance channels, in addition to destruction from waves.

3. If your Tsunami Evacuation Plan includes moving your boat offshore, plan to have enough fuel, food and water, and anything else you consider essential for at least 24 hours.

4. If you decide to move your boat offshore, you must be at least 2 miles away from the channel entrance buoy prior to the expected arrival time of the tsunami. Otherwise, do not attempt to move your boat offshore or you may be caught in the tsunami or the dangerous currents associated with it.

5. If you have enough time to move your boat offshore, consider having someone drive you to the harbor. If you drive yourself and leave your vehicle in the harbor parking lot, it may sustain damage from the tsunami while you are offshore in your boat.

6. If your boat is in an evacuation zone and cannot be moved inland or offshore, determine ahead of time what you want to remove and how you will secure the boat. As soon as a Tsunami Watch is declared, remove the items, secure the boat, and leave the evacuation zone.

7. All shores of all Hawaiian Islands are subject to seasonal high surf, some of which directly impacts boat channels and harbor entrances. If a Tsunami Warning occurs during a period of seasonal high surf, especially at night, and your Tsunami Evacuation Plan calls for moving your boat offshore, you should give serious consideration to just removing whatever you can, securing your boat, and leaving the evacuation zone.

8. Forty-five minutes before the expected arrival of the first wave, roadblocks will be established by police and Civil Defense volunteers at the perimeters of the evacuation zones. After that, only police officers, fire fighters, lifeguards, EMS personnel, and Civil Defense volunteers will be allowed into the evacuation zones to assist those individuals who are still evacuating. Therefore, if you intend to take some kind of emergency action for your boat, you should complete it and be out of the evacuation zone at least one hour prior to the expected arrival of the first wave.

9. Anticipate heavy traffic island-wide when a Tsunami Warning is issued. Allow ample travel time to reach your boat before the evacuation zones are closed to non-emergency traffic.

10. If, for any reason, you are unable to attend to your boat during a Tsunami Warning, designate someone else to carry out your Tsunami Evacuation Plan.

### **BOATS AT SEA DURING A TSUNAMI**

1. Tsunami wave activity is imperceptible in the open ocean, so that would normally be the safest place for most boats. However, in Hawaii small-boat owners must take seasonal high surf conditions and rough seas outside the harbors into consideration before moving their boats offshore.

2. Most large harbors and ports are under the control of a harbor authority and a vessel traffic system. If the harbor authority orders a forced evacuation of vessels to deeper water, you will need to be aware of the traffic, especially if it will impact you and your boat.
3. If you do not have a marine or citizens band (CB) radio on your boat, make sure that a transistor radio is part of your survival kit.
4. If the official All Clear announcement is not given for some time, anchor your boat if possible or operate it in a manner that will conserve fuel. The tsunami warning may last for hours and ocean conditions following it may not permit a quick return to port.
5. There will be a lot of boating traffic in your area. If you are anchored at night, put on your anchor lights. If you are underway, put on your running lights.

### **BOATS AT SEA AFTER A TSUNAMI**

1. Damaging wave activity and dangerous currents can affect harbors for an undetermined period of time following the impact of the tsunami on the coast. Do not return to port until an official All-Clear announcement is given on the radio by the Civil Defense agency.
2. Tsunami damage may prevent you from returning to the facility from which you departed. After the All-Clear announcement is given, you may need to go to another facility or anchor offshore.
3. Be alert for people who may have been swept out to sea by the tsunami.
4. Be prepared to yield to or assist emergency personnel involved in rescue or salvage operations.